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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/670,234	09/26/2003	Eiju Komuro	243190US2	8559

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OBLON, SPIVAK, MCCLELLAND, MAIER & NEUSTADT, P.C.
1940 DUKE STREET
ALEXANDRIA, VA 22314

EXAMINER	
TAKAOKA, DEAN O	

ART UNIT	PAPER NUMBER
2817	

DATE MAILED: 01/19/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/670,234	KOMURO ET AL.	
	Examiner	Art Unit	
	Dean O Takaoka	2817	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-8* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *1 and 3* is/are allowed.

6)☒ Claim(s) *2 and 5-8* is/are rejected.

7)☒ Claim(s) *4* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *26 September 2003* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *9/26/03*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Drawings

Figures 10a and 10b should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g).

Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.121(d)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Objections

Claims 6, 7, and 10 are objected to because of the following informalities:

Claims 6 and 7:

The preamble "filter" (claim 6) and "duplexer" (claim 7) is different from the preamble in the independent claims (claims 1–3) where "A thin-film piezoelectric resonator" is recited. For consistency, the Examiner requests the preamble of dependent claims 6 and 7 to be the same as in the independent claims "A thin-film piezoelectric resonator", and suggests the limitations "filter" and "duplexer" may be recaptured in the body of the claim/s.

Claim 10:

The word "froming" (line 7) should be --forming--. The phrase "at least one of forming step of" (line 8) should be reworded to be placed in a more grammatically correct syntax.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claim 8 is rejected under 35 U.S.C. 102(e) as being anticipated by Nishihara et al. (U.S. Patent No. 6,734,763).

Nishihara et al. (Figs. 6A-6E in view of Figs. 12 or 15) shows a method of fabricating a thin film piezoelectric resonator including a piezoelectric thin film (123), and an upper electrode (122) and a lower electrode (121) arranged on opposite surfaces of the piezoelectric thin film (Fig. 6E) for applying an excitation voltage to the piezoelectric thin film (col.1, lines 29-47), the method comprising steps of forming the lower electrode and upper electrode (Figs. 6A-6E) including at least two film-forming patterning processes (where the top and bottom electrodes are separately patterned by sputtering, masking or resist, and etching – col. 10, line 47 to col. 11, line 12) where a mask used in the first patterning process is different in shape from a mask used in the second

patterning process (where with respect to 15, the top and bottom electrodes have different shapes, inherently having different resists or masks).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claim 2 is rejected under 35 U.S.C. 103(a) as being obvious over Whatmore et al. (U.S. Patent No. 6,774,746) in view of Barber (U.S. Patent No. 6,601,276).

The applied reference has a common inventor with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art only under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 103(a) might be overcome by: (1) a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not an invention "by another"; (2) a showing of a date of invention for the claimed subject matter of the application which corresponds to subject matter disclosed but not claimed in the reference, prior to the effective U.S. filing date of the reference under 37 CFR 1.131; or (3) an oath or declaration under 37 CFR 1.130 stating that the application and reference are currently owned by the same party and that the inventor named in the application is the prior inventor under 35 U.S.C. 104, together with a terminal disclaimer in accordance with 37 CFR 1.321(c). For applications filed on or after November 29, 1999, this rejection might also be overcome by showing that the subject matter of the

reference and the claimed invention were, at the time the invention was made, owned by the same person or subject to an obligation of assignment to the same person. See MPEP § 706.02(l)(1) and § 706.02(l)(2).

Whatmore et al. shows a thin film piezoelectric resonator comprising a piezoelectric thin film (23), an upper electrode (24) and a lower electrode (25) arranged on opposite surfaces of the piezoelectric thin film (Fig. 2) for applying an excitation voltage to the piezoelectric thin film (Fig. 7), and ground electrodes (both labeled 27) arranged on the same plane as the upper electrode where the upper electrode and lower electrode includes a resonant portion (defined by hole 26) and a lead out portion (shown in the top view of Fig. 2 where top and bottom electrodes 24 and 25 show lead out portions) where the electrode thicknesses are different (abstract) but is silent where the electrode thickness of the ground electrode (27) is larger than the electrode thickness of the resonant portion (defined by electrodes 24 and 25).

Barber shows a similar a thin film piezoelectric resonator comprising a piezoelectric thin film (18), an upper electrode (24) and a lower electrode (22) and further comprising a single ground electrode (42) where the electrode thickness of the ground electrode is larger than the electrode thickness of the top electrodes in the same plane (40, 44).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the ground electrodes disclosed by Whatmore et al. with the thicker ground electrodes disclosed by Barber. Such a modification would have realized the advantageous benefit of varying the resonant frequencies for tuning

the filter (col. 5, line 64 to col. 6, line 9; Barber) thus suggesting the obviousness of the modification.

Claims 5 – 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Whatmore et al. and Barber ('276) as applied to claim 2 above, and further in view of Barber et al. (U.S. Patent No. 6,657,517) or Nishihara et al. and Barber et al. (U.S. Patent No. 6,674,291).

Whatmore et al. and Barber ('276) teach the thin film piezoelectric resonator comprising a piezoelectric thin film, discussed in the reasons for rejection of claim 2 above, where Whatmore shows a ladder filter (Figs. 7 and 9) and responses (Figs. 3 – 6 and Fig. 8) and Barber ('276) further teaches a T cell filter (col. 2, line 5); but Whatmore et al. and Barber ('276) are silent with respect to the thickness of the piezoelectric thin film not larger than 5um or used in a duplexer.

Barber et al. ('517 and '291) and Nishihara et al. teach similar thin film piezoelectric resonators comprising a piezoelectric thin film where Barber et al. ('517) teaches the piezoelectric thin film having a thickness of 2.3um (Fig. 1) and where Nishihara et al. teaches the piezoelectric thin film having a thickness of 500nm (col. 8, lines 58,59). Barber ('291) further teaches a thin film resonator (TFR) comprising a T cell filter for use in a duplexer (col. 4, lines 46-54, col. 7, lines 1-10 and col. 11, lines 57-60).

It would have been obvious to one of ordinary skill in the art at the time the

invention was made to have used the piezoelectric thin film disclosed by Whatmore et al. and Barber ('276) with the piezoelectric thin film not larger than 5um disclosed by Barber et al. ('517) and Nishihara et al. in a duplexer disclosed by Barber et al. ('291). Such a modification would have been obvious where Barber et al. ('517) teaches the thickness of the piezoelectric thin film and material properties of the electrode films determines the resonant frequency (col. 1, lines 61-65; Barber '517) where Barber further teaches a desired resonant frequencies of 900Mhz for the 2.3um thickness piezoelectric film layer (col. 2, lines 15-23; Barber '517); where Nishihara et al. teaches a desired frequency of 5GHz (col. 8, line 34); thus making the thickness of the piezoelectric thin film to a desired frequency as is well-known in the art. Barber ('291) further teaches the TFR comprising a T cell filter such as in the previous Barber references where Barber ('291) specifically teaches the TFR T cell filter for use in duplexers where the duplexer provides a device for transmit and receive filtering such as in PCS application (col. 7, line 4; Barber '291); further where TFR filters are well known in the art to be used in duplexers applications thus suggesting the obviousness of the modifications.

Allowable Subject Matter

Claims 1 and 3 are allowed.

The following is a statement of reasons for the indication of allowable subject matter: Barber ('517) and Misu et al. show a piezoelectric thin film resonator with top and bottom electrodes comprising different thicknesses but does not teach the lead out portion of the electrode being larger than the resonant section (claim 3). Barber shows

a generic cross-sectional view of the piezoelectric thin film resonator where the different thicknesses of the top and bottom electrodes sandwiching the piezoelectric material shown in Fig. 1 would comprise the resonant section.

Kub et al. (604, 605 – Fig. 6) and Ella et al. (col. 5, lines 63-65) show a piezoelectric thin film resonator with top and bottom electrodes comprising different materials but do not teach or suggest where the lead out portion of the electrodes would comprise different materials than the resonant section (claim 3).

Claim 4 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Kub et al. – shows electrodes of different materials.

Ella et al. – shows electrodes of different materials.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dean O Takaoka whose telephone number is (571) 272-1772. The examiner can normally be reached on 8:30a - 5:00p Mon - Fri.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Pascal can be reached on (571) 272-1769. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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January 11, 2005